

REMARKS

Applicants appreciate the Examiner's thorough examination of the present application as evidenced by the Office Action of December 14, 2005 (hereinafter "Office Action"). In response, Applicants respectfully submit that the cited reference does not disclose, at least, flushing a barrier metal layer with a gas that comprises a halogen group gas. Therefore, Applicants respectfully submit that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Independent Claims 1 and 24 are Patentable

Independent Claims 1 and 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by U. S. Patent No. 6,838,772 to Saitoh et al. (hereinafter "Saitoh"). (Office Action, page 2).

Independent Claim 1 recites, in part:

...
forming a barrier metal layer on the lower conductive pattern;
flushing the barrier metal layer with a gas that comprises a halogen
group gas;
...

Similarly, independent claim 24 recites, in part:

...
depositing a barrier metal layer on the semiconductor substrate with the
lower conductive pattern using a metal organic precursor;
flushing the deposited metal layer; and
forming an upper conductive layer on the semiconductor substrate with
the flushed barrier metal layer,
wherein the step of flushing the barrier metal layer uses a processing
gas including TiCl_4 gas and argon gas.

Thus, according to independent Claims 1 and 24 a barrier metal layer is flushed using a halogen gas generally or, in particular (Claim 24), by using the halogen gas TiCl_4 along with argon gas.

In rejecting independent Claims 1 and 24, the Office Action cites the description accompanying FIGS. 11 - 14 of Saitoh at columns 19 - 22. In reviewing this passage,

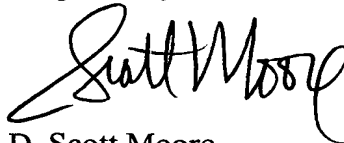
however, Applicants are unable to find any mention of using a halogen group gas or TiCl_4 gas for flushing a barrier metal layer. Applicants acknowledge that Saitoh describes gases that incorporate a halogen, such as chlorine. Saitoh describes these gases, however, as being used to form the conductor film 17b2, not as part of a flushing operation on any of the conductor film 17b layers. (Saitoh, col. 21, lines 12 - 59). Saitoh does state that argon gas can be used to clean the surface of a TiCl_4 layer as part of forming the conductor film 17b2 (Saitoh, col. 21, lines 38 - 42). Argon gas, however, is not a halogen group gas and the TiCl_4 gas used to form the TiCl_4 layer is not used as part of the cleaning/flushing process.

For at least the foregoing reasons, Applicants respectfully submit that independent Claims 1 and 24 are patentable over Saitoh and that dependent Claims 2 - 23 and 25 - 38 are patentable at least as they depend from an allowable claim.

CONCLUSION

In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,



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In re: Jung-hun Seo et al.

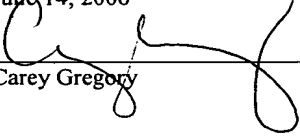
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on June 14, 2006


Carey Gregory